

23. An automotive vehicle drive unit assembly comprising:

first and second driving axle shafts being co-linear and defining a lateral axis of rotation;

first and second wheel hubs driven by said first and second driving axle shafts respectively about said lateral axis of rotation;

a first gear set for driving said first wheel hub;

a second gear set for driving said second wheel hub;

a first electric motor for driving said first gear set and defining a first longitudinal axis of rotation that is transverse to said lateral axis of rotation;

a second electric motor for driving said second gear set and defining a second longitudinal axis of rotation that is transverse to said lateral axis of rotation and spaced apart from said first longitudinal axis of rotation; and

first and second planetary gear sets driven by said first and second gear sets about said lateral axis of rotation.

24. An assembly as set forth in Claim 23 wherein said planetary gear sets are incorporated into said wheel hubs.

25. An assembly as set forth in Claim 23, including a first gearbox for housing said first gear set and a second gearbox for housing said second gear set, said first and second gearboxes being mounted to said first and second electric motors respectively and wherein said first and second planetary gear sets are incorporated into first and second gearboxes.

26. An assembly as set forth in Claim 23, wherein said first gear set includes a first pinion gear in driving engagement with a first ring gear mounted for rotation with said first wheel hub and said second gear set includes a second pinion gear in driving engagement with a second ring gear mounted for rotation with said second wheel hub.

27. An assembly as set forth in Claim 26, wherein said first planetary gear set includes a first sun gear mounted for rotation with said first ring gear and a first plurality of planet gears in meshing engagement with a first planetary ring gear hub and said second planetary gear set includes a second sun gear mounted for rotation with said second ring gear and a second plurality of planet gears in meshing engagement with a second planetary ring gear hub.

28. An assembly as set forth in Claim 27, wherein said first planetary ring gear hub drives said first wheel hub and said second planetary ring gear hub drives said second wheel hub.

29. An assembly as set forth in Claim 27, wherein said first planetary ring gear hub drives said first driving axle shaft and said second planetary ring gear hub drives said second driving axle shaft.

30. An assembly as set forth in Claim 29, wherein said first planetary ring gear hub is integrally formed with said first driving axle shaft as one piece and said second planetary ring gear hub is integrally formed with said second driving axle shaft as one piece.

31. An assembly as set forth in Claim 30, wherein said first gear set and said first planetary gear set are housed within a first common gearbox mounted to said first electric motor and said second gear set and said second planetary gear set are housed within a second common gearbox mounted to said second electric motor.

32. An assembly as set forth in Claim 23, including a third electric motor in parallel driving relationship with said first electric motor to drive said first gear set and a fourth electric motor in parallel driving relationship with said second electric motor to drive said second gear set wherein said first and third electric motors drive said first gear set and said second and fourth electric motors drive said second gear set independently from each other.

33. An assembly as set forth in Claim 32, wherein said first and said third electric motors extend radially from said first gear set, and said second and said fourth electric motors extend radially from said second gear set.

34. An assembly as set forth in Claim 33, wherein said first gear set includes a first pinion gear driven by said first electric motor and a second pinion gear driven by said third electric motor, said first and second pinion gears for simultaneously driving a first ring gear and wherein said second gear set includes a third pinion gear driven by said second electric motor and a fourth pinion gear driven by said fourth electric motor, said third and fourth pinion gears for simultaneously driving a second ring gear.

35. An assembly as set forth in Claim 34, wherein said first gear set is housed within a first gearbox mounted to said first and third electric motors and said second gear set is housed within a second gearbox mounted to said second and fourth electric motors.

36. An assembly as set forth in Claim 23, wherein said first and second longitudinal axes of rotation are perpendicular to said lateral axis of rotation.

37. An assembly as set forth in Claim 23, wherein one of said electric motors is mounted at a 90 degree angle extending generally horizontally and forwardly relative to said lateral axis of rotation and the other of said electric motors is mounted at a 90 degree angle extending generally horizontally and rearwardly relative to said lateral axis of rotation.

38. An assembly as set forth in Claim 23, wherein said first and second electric motors are supported by a common axle housing extending along said lateral axis of rotation.

39. An assembly as set forth in Claim 23, wherein said first and second motors are mounted at a 90 degree angle extending generally vertically and upwardly from said lateral axis of rotation.

40. An assembly as set forth in Claim 23, wherein said first and second motors are mounted at an angle extending generally horizontally and rearwardly from said lateral axis of rotation.

41. An automotive vehicle drive unit assembly comprising:

first and second driving axle shafts being co-linear and defining a lateral axis of rotation;

first and second wheel hubs driven by said first and second driving axle shafts respectively about said lateral axis of rotation;

a first gear set for driving said first wheel hub;

a second gear set for driving said second wheel hub;

a first electric motor for driving said first gear set and defining a first longitudinal axis of rotation that is transverse to said lateral axis of rotation;

a second electric motor for driving said second gear set and defining a second longitudinal axis of rotation that is transverse to said lateral axis of rotation and spaced apart from said first longitudinal axis of rotation;

a third electric motor in parallel driving relationship with said first electric motor to drive said first gear set; and

a fourth electric motor in parallel driving relationship with said second electric motor to drive said second gear set wherein said first and third electric motors drive said first gear set and said second and fourth electric motors drive said second gear set independently from each other.

42. ~~An assembly as set forth in Claim 23, including first and second planetary gear sets driven by said first and second gear sets about said lateral axis of rotation.~~

43. An assembly as set forth in Claim 42, wherein said first gear set is housed within a first gearbox mounted to said first and third electric motors and said second gear set is housed within a second gearbox mounted to said second and fourth electric motors.

44. An assembly as set forth in Claim 43, wherein said first gear set includes a first pinion gear in driving engagement with a first ring gear mounted for rotation with said first wheel hub and said second gear set includes a second pinion gear in driving engagement with a second ring gear mounted for rotation with said second wheel hub.

45. An assembly as set forth in Claim 44, wherein said first planetary gear set includes a first sun gear mounted for rotation with said first ring gear and a first plurality of planet gears in meshing engagement with a first planetary ring gear hub and said second planetary gear set includes a second sun gear mounted for rotation with said second ring gear and a second plurality of planet gears in meshing engagement with a second planetary ring gear hub.

46. An assembly as set forth in Claim 41 wherein said third electric motor defines a third longitudinal axis of rotation that is co-linear with said first longitudinal axis of rotation and said fourth electric motor defines a fourth axis of rotation that is co-linear with said second longitudinal axis of rotation.

47. ~~An automotive vehicle drive unit assembly comprising:~~

~~a first driving axle shaft;~~

~~a second driving axle shaft, said first and second driving axle shafts being co-linear and defining an axis of rotation;~~

~~a first wheel hub driven by said first driving axle shaft;~~

~~a second wheel hub driven by said second driving axle shaft, said first and second wheel hubs driven about said axis of rotation, said first and second wheel hubs each including a common outer periphery about said axis of rotation;~~

~~a first gear set for driving said first wheel hub;~~

~~a second gear set for driving said second wheel hub; and~~

~~a pair of electric motors including a single first electric motor mounted at a non-parallel angle relative to said axis of rotation of said first driving axle shaft for driving said first gear set and a single second electric motor mounted at a non-parallel angle relative to said axis of rotation of said second driving axle shaft for driving said second gear set independently from said first electric motor wherein one of said pair of electric motors is mounted at a 90 degree angle extending generally horizontally and forwardly relative to said axis of said first wheel hub and the other of said pair of electric motors is mounted at a 90 degree angle extending generally horizontally and rearwardly relative to said axis of said second wheel hub, said first and second electric motors being mounted at least partially within said common outer periphery.~~

48. A vehicle comprising:

a vehicle body extending between lateral sides, passenger seats being mounted adjacent each of said lateral sides, a floor defined beneath said passenger seats, an aisle defined between said passenger seats, and said floor also extending beneath said aisle;

at least one driving axle for driving a pair of laterally spaced wheels including a first drive axle shaft associated with the first of said wheels, and a second drive axle shaft associated with the second of said wheels, said first and second drive axle shafts defining an axis of rotation;

a first and second gear set for driving said first and second wheels;

a first electric motor mounted at a non-parallel angle relative to said axis of rotation of said first drive axle shaft for driving said first gear set, and a second electric motor mounted at a non-parallel angle relative to said axis of rotation of said second drive axle shaft and operatively connected to drive said second gear set; and

said electric motors being mounted adjacent to said wheels at a vertical position which is higher than a vertical position of the floor of said aisle.

49. A vehicle as set forth in Claim 48, including a third electric motor mounted in parallel driving relationship with said first electric motor to assist in driving said first gear set and a fourth electric motor mounted in parallel driving relationship with said second electric motor to assist in driving said second gear set.



50. A vehicle as set forth in Claim 49, including a first planetary gear set driven by said first and third electric motors via said first gear set for speed reduction at said first wheel and a second planetary gear set driven by said second and fourth electric motors via said second gear set for speed reduction at said second wheel.

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